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(54) **Tilt holding force adjusting mechanism for steering column**

Verstelleinrichtung für die Haltekraft einer in der Höhe einstellbaren Lenksäule

Dispositif pour régler la force de serrage d'une colonne de direction à inclinaison réglable

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## Description

[0001] The present invention relates to an assembly for supporting a steering column of a vehicle, comprising: a bracket structure comprising a distance bracket member for supporting the steering column, and an upper clamp member for supporting the distance bracket member, said upper clamp member comprising first and second side walls each formed with an elongate aperture for allowing the distance bracket member to move between said first and second side walls to adjust a position of the steering column; a tilt bolt passing through said distance bracket member and the elongate apertures of the upper clamp member, said tilt bolt comprising first and second end portions; a tilt lever screwed on said first end portion of the tilt bolt; and an adjusting mechanism which comprises a bolt rotation stopper comprising a washer portion mounted on said second end portion of said tilt bolt, and an engaging portion engaging with said bracket structure, and a stopper fixing nut screwed on the second end portion of the tilt bolt for fixing said stopper to said tilt bolt.

[0002] Such an assembly is shown in GB-A-2 287 773.

[0003] In a tilt steering column according to another similar assembly, a distance bracket is fixed and released in an upper clamp by applying or removing a tightening force of a tilt bolt tightening the upper clamp with a rotatable tilt lever. In the released state, the distance bracket is movable up and down, and the steering column supported by the distance bracket is adjustable at a desired inclined angle.

[0004] As shown in Fig. 7, a jacket tube 2 receives a rotatable steering shaft 1 coaxially. The jacket tube 2 is fixedly mounted on the distance bracket 3. The distance bracket 3 is movable up and down in the upper clamp 4 fixed to a vehicle body. A tilt bolt 6 passes through vertical elongate apertures 5 formed in right and left side walls of the upper clamp 4 and holes of the distance bracket 3. A first end portion of the tilt bolt 6 engages with a tilt lever 7 and a second end portion of the tilt bolt 6 engages with a tilt bolt stopper 8 serving as a rotation preventing detent member. These members constitute a tilt holding force adjusting mechanism. The upper clamp 4 can fasten or release the distance bracket 3 when the tilt lever 7 is rotated in a forward or reverse direction.

[0005] As shown in Fig. 8, the first end of the tilt bolt 6 has a threaded portion 9. A nut 10 is fixed to the tilt lever 7, and screwed on the threaded portion 9. The second end portion of the tilt bolt 6 is integrally formed with an outward flange 11. Serrations 12 are formed on the outside periphery of the flange 11. The tilt bolt stopper 8 has a hole and first and second projections 14. Serrations 13 are formed on the inside circumferential surface of the hole of the tilt bolt stopper 8. The hole of the stopper 8 receives the flange 11, and the external serrations 12 of the flange 11 engage with the internal serrations

13 of the hole. The projections 14 of the tilt bolt stopper 8 are integrally formed in the stopper 8 at diametrically opposite positions across the hole. The projections 14 engage in one of the elongate apertures 5 of the upper clamp 4 and thereby prevent rotation. When the tilt lever 7 is operated rotationally, the tilt bolt 6 is prevented from rotation. A push nut 15 holds the tilt bolt stopper 8 on the second end of the tilt bolt 6 by pressing the tilt bolt stopper 8 to the side wall of the upper clamp 4 in order to prevent falling.

[0006] The threaded portion 9 of the tilt bolt 6 is in the form of left hand screw in order that the upper clamp 4 fixes the distance bracket 3 when the tilt lever 7 is operated in the direction of lifting.

[0007] In the conventional tilt holding force adjusting mechanism of the tilt bolt 6 and the tilt bolt stopper 8, however, the adjustment of the clamping force of the upper clamp 4 clamping the distance bracket 3 requires the disengagement and reengagement of the serrations 12 and 13. The adjustment of the clamping force minutely requires a complicated and time-consuming operation to adjust tooth by tooth by dismantling and reassembling the adjusting mechanism.

[0008] In principle the same applies to the assembly as indicated above.

[0009] It is therefore an objective of the present invention to provide an assembly as indicated above in which the tilt holding force adjusting mechanism of the steering column enabling stepless adjustment.

[0010] According to the present invention, this objective is solved for an assembly as indicated above in that said tilt bolt further comprises an outward flange and that said washer portion of said stopper is clamped between said outward flange of said tilt bolt and said fixing nut.

[0011] After the tilt lever is screwed and tightened on the tilt bolt, the tilt bolt can be fixed with the tilt bolt stopper regardless of the rotational position of the tilt bolt. This allows stepless, continuous adjustment.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is an exploded perspective view showing a main part of a tilt holding force adjusting mechanism according to a first embodiment of the present invention.

[0013] Fig. 2 is an exploded perspective view showing a main part of a tilt holding force adjusting mechanism according to a second embodiment of the present invention.

[0014] Fig. 3 is an exploded perspective view showing a tilt bolt stopper according to a third embodiment of the present invention.

[0015] Fig. 4 is a side view showing the first embodiment in an assembled state.

[0016] Fig. 5 is a sectional view taken across a line V-V of Fig. 4.

[0017] Fig. 6 is a sectional view similar to Fig. 5, but showing the second embodiment.

[0018] Fig. 7 is a sectional view showing a conven-

tional tilt holding force adjusting mechanism.

[0019] Fig. 8 is an exploded perspective view of a main part of Fig. 7.

#### DETAILED DESCRIPTION OF THE INVENTION

[0020] The first embodiment of the present invention is shown in Figs. 1, 4 and 5. A tilt steering column assembly shown in Figs. 1, 4 and 5 includes a distance bracket member 32 for supporting the steering column, and an upper clamp member 34 for supporting the distance bracket member 32. The distance bracket member 32 and the upper clamp member 34 constitute a bracket structure for supporting the steering column. These members 32 and 34 are substantially identical with the distance bracket 3 and the upper clamp 4 of the conventional steering column assembly shown in Fig. 7. The upper clamp member 34 has first and second (or left and right) side walls 35 each formed with an elongate aperture (or elongate hole) 36 for allowing the distance bracket member 32 to move up and down between the first and second side walls 35 to adjust a position of the steering column. A tilt bolt 20 passes through holes of the distance bracket member 32 and the elongate apertures 36 of the upper clamp member 34.

[0021] As shown in Fig. 1 and Figs. 4 and 5, the tilt bolt 20 has first and second threaded end portions 21 and 22 and an outward flange 23. The tilt bolt 20 has an intermediate shank extending between the first and second end portions 21 and 22. The intermediate shank is received in the upper clamp member 34. As viewed in Fig. 5, the first end portion 21 projects outward in one (leftward) direction from the first side wall 35 of the upper clamp member 34. The second end portion 22 projects outward in the opposite (rightward) direction from the second side wall 35 of the upper clamp member 34. The flange 23 is formed between the intermediate shank and the second end portion 22. The second end portion 22 projects from the flange 23. Serrations are not formed on the outside periphery of the flange 23 unlike said conventional example. The flange 23 of this example has a smooth cylindrical outside surface. The first threaded portion 21 of this tilt bolt 20 is formed as left-hand screw like said conventional example, but the second threaded portion 22 may be formed as either right-hand or left-hand screw. A fastening tool fitting non-circular portion 31 such as a non-circular recess or a non-circular projection is formed on the tip of the threaded portion 22. The non-circular portion 31 extends axially from the second end of the tilt bolt 20, and has a non-circular cross section. For example, the non-circular portion 31 has a polygonal cross section which is radially symmetrical around the axis of the bolt 20. In this example, the non-circular portion 31 is a hexagonal hole having a hexagonal cross section.

[0022] A nut 10 is fixed to a tilt lever 7. The nut 10 of the tilt lever 7 is screwed on the first threaded portion 21 like said conventional example.

[0023] A stopper fixing nut 24 and a tilt bolt rotation stopper 25 constitute an adjusting mechanism. The tilt bolt rotation stopper 25 comprises a washer portion 27 and an engaging portion 28. The washer portion 27 comprises a through hole 26 loosely fitting over the second threaded portion 22 of the tilt bolt 20. The inside surface defining the through hole 26 of this example is a smooth cylindrical surface, having no serrations. The engaging portion 28 extends radially and outwardly from the washer portion 27 and has a hooked end engaging with the distance bracket member 32. In this example, the distance bracket member 32 has a projecting portion projecting beyond the second side wall 35 of the upper clamp member 34. An engaging hole 33 is formed in the projecting portion of the distance bracket member 32. The hooked end of the engaging portion 28 of the bolt stopper 25 is received in the engaging hole 33 of the distance bracket member 32. The engaging portion 28 of the stopper 25 projects beyond the second side wall 35 of the upper clamp member 34. The tilt bolt stopper 25 is tightly locked by the stopper fixing nut 24 screwed on the second threaded portion 22 in the state in which the engaging portion 28 of the stopper 25 is engaged with the engaging hole 33 of the distance bracket 32. The threaded hole of the stopper fixing nut 24 passes through the nut 24, and the second end of the tilt bolt 20 projects from the nut 24 as shown in Fig. 5. The stopper fixing nut 24 of this example has an outward flange abutting on the washer portion 27 of the bolt stopper 25.

[0024] In the second embodiment shown in Fig. 2, a tilt bolt stopper 25 has a pair of engaging portions 29 and 29 which oppose each other diametrically in the washer portion 27 and which engage with the elongate aperture 36 of the second side wall 35 of the upper clamp member 34.

[0025] In the third embodiment shown in Fig. 3, the washer portion 27 of a tilt bolt rotation stopper 25 has a non-flat side surface formed with a plurality of ribs 30 for assisting a friction fixation. The ribs 30 may be formed in the side surface of the flange 23 of the tilt bolt 20.

[0026] The engaging portion 28 in each of the examples of Figs. 1 and 3 engages with the engaging hole 33 of the distance bracket 32 whereas the engaging portions 29 and 29 in Fig. 2 engage with the second side elongate aperture 36 of the upper clamp member 34.

[0027] In the first embodiment as shown in Figs. 4 and 5, the tilt lever 7 is held stationary at a tightening position for tightening the tilt bolt 20 so as to produce a required holding force, and the upper clamp 34 is put in a state capable of clamping the distance bracket 32 firmly between both side walls 35. Then, the tilt bolt stopper 25 is mounted on the second threaded portion 22 of the tilt bolt 20 so that the threaded portion 22 is inserted into the through hole 26 and the engaging portion 28 of the tilt bolt stopper 25 is inserted into the engaging hole 33 of the distance bracket 32. In this state, the stopper fixing nut 24 is screwed on the threaded portion 22, so that

the tilt bolt 20 and the tilt bolt stopper 25 are tightened and fixed together. The washer portion 27 of the stopper 25 is firmly clamped between the flange 23 of the tilt bolt 20 and the fixing nut 24.

[0028] According to the second embodiment, as shown in Fig. 6, in the state in which the engaging portions 28 and 29 of the tilt bolt stopper 25 can be inserted into the second side elongate aperture 36 of the upper clamp member 34, the tilt bolt stopper 25 is mounted on the threaded portion 22 and tightly locked by the stopper fixing nut 24 screwed on said threaded portion 22.

[0029] When the tilt lever 7 is rotated in a releasing direction to loosen the tilt bolt 20 and to remove the clamping force of the distance bracket 32, the tilt bolt 20 becomes movable along the elongate apertures 36 formed in the side walls 35 of the upper clamp member 34.

[0030] In the first through third embodiments, the stopper fixing nut 24 can prevent looseness with a high bolt axial force (axial load) acting on the nut 24 screwed on the tilt bolt 20. However, it is optional to fix the stopper fixing nut 24 by caulking or staking as failsafe structure, or employ a caulking or staking nut as the stopper fixing nut 24. As other means for preventing looseness, it is optional to employ a technique of applying screw locking material to the threaded portion 22 and the stopper fixing nut 24, or a technique of engaging the stopper fixing nut 24 with a cut and bent portion formed in the tilt bolt stopper 25.

[0031] After the tilt lever is tightened on the tilt bolt 20 so as to produce a required holding force, the threaded portion 22 of the tilt bolt 20 is inserted into the hole 26 of the tilt bolt stopper 25 and the stopper fixing nut 24 is tightened onto the tilt bolt 20. Therefore, the locking between the tilt bolt 20 and the tilt bolt stopper 25 is stepless. The working efficiency of the process for making the tilt holding force adjusting mechanism improves. In case of readjustment, because it is not necessary to remove the tilt bolt stopper 25 and the stopper fixing nut 24, the adjustment is simple, quick, easy and superior in working efficiency. The tilt holding force adjusting mechanism mounted coaxially on the tilt bolt 20 does not increase the space, and is advantageous in compactness.

[0032] The present invention eliminates the necessity of serration and thereby facilitates the machining and processing step for manufacturing the tilt holding force adjusting mechanism. The present invention utilizing the frictional force to prevent rotation of the tilt bolt enables stepless adjustment and facilitates the assembly of the tilt steering column assembly.

#### Claims

1. An assembly for supporting a steering column (1) of a vehicle, comprising:

a bracket structure comprising a distance bracket member (32) for supporting the steering column (1), and an upper clamp member (34) for supporting the distance bracket member (32), said upper clamp member (34) comprising first and second side walls (35) each formed with an elongate aperture (36) for allowing the distance bracket member (32) to move between said first and second side walls (35) to adjust a position of the steering column (1); a tilt bolt (20) passing through said distance bracket member (32) and the elongate apertures (36) of the upper clamp member (34), said tilt bolt (20) comprising first and second end portions (21, 22);

a tilt lever (7) screwed on said first end portion (21) of the tilt bolt (20); and an adjusting mechanism which comprises a bolt rotation stopper (25) comprising a washer portion (27) mounted on said second end portion (22) of said tilt bolt (20), and an engaging portion (28; 29) engaging with said bracket structure, and a stopper fixing nut (24) screwed on the second end portion (22) of the tilt bolt (20) for fixing said stopper (25) to said tilt bolt (20),

#### characterized in that

said tilt bolt (20) further comprises an outward flange (23) and that said washer portion (27) of said stopper (25) is clamped between said outward flange (23) of said tilt bolt (20) and said fixing nut (24).

2. An assembly according to claim 1, wherein said upper clamp member (34) is adapted to be fixed to a vehicle body, said second end portion (22) of said tilt bolt (20) is formed with a screw thread, said engaging portion (28; 29) of said stopper (25) engages with one of said distance bracket member (32) and said elongate aperture (36) formed in said second side wall (35) of said upper clamp member (34), and said washer portion (27) and said engaging portion (28; 29) are integral parts of said stopper (25).
3. An assembly according to claim 1, wherein said second end portion (22) of said tilt bolt (20) is formed with a non-circular portion (31) for receiving a torque turning said tilt bolt (20).
4. An assembly according to claim 1, wherein one of said outward flange (23) of said tilt bolt (20) and said washer portion (27) of said stopper (25) comprises a non-flat side surface formed with at least one rib (30).
5. An assembly according to one of the claims 1 to 4, wherein said engaging portion (28) of said stopper

- (25) is configured to prevent rotation of said stopper (25), and engaged with one of an engaging hole (33) formed in said distance bracket member (32) and said elongate aperture (36) formed in said second side wall (35) of said upper clamp member (34).
6. An assembly according to one of the claims 1 to 5, wherein said fixing nut (24) is a non-cap nut and comprises an internally threaded through hole extending through said nut (24) from a first open end opening in a first side of said fixing nut (24) and a second open end opening in a second side of said fixing nut (24), and said second end portion (22) of said tilt bolt (20) comprises a non-circular portion extending axially and having a polygonal cross sectional shape.
  7. An assembly according to claim 6, wherein said non-circular portion (31) of said tilt bolt (20) is in a form of one of a non-circular recess and a non-circular projection.
  8. An assembly according to one of the claims 1 to 7, wherein said outward flange (23) of said tilt bolt (20) is clamped between said second side wall (35) of said upper clamp member (34) and said washer portion (27) of said stopper (25).
  9. An assembly according to one of the claims 1 to 8, wherein said tilt lever (7) comprises a clamping nut (10) screwed on said first end portion (21) of said tilt bolt (20).
  10. An assembly according to claim 9, wherein said outward flange (23) of said tilt bolt (20) comprises a non-serrated smooth outside circumferential surface, and wherein said washer portion (27) of said stopper (25) comprises a center hole having a non-serrated smooth inside circumferential surface.
  11. An assembly according to claim 9, wherein said outward flange (23) of said tilt bolt (20) comprises an inner side surface abutting on said second side wall (35) of said upper clamp member (34), an outer side surface abutting on said washer portion (27) of said stopper (25), and an outside circumferential surface which is spaced from said stopper (25).
  12. An assembly according to one of the claims 1 to 11, wherein the steering column (1) is fixedly mounted on said distance bracket member (32), said distance bracket member (32) comprises first and second side walls which are formed, respectively, with through holes receiving said tilt bolt (20) and which are placed between said first and second side walls (35) of said upper clamp member (34), and said upper clamp member (34) is placed between said tilt lever (7) and said outward flange (23) of said tilt bolt (20).
  13. An assembly according to one of the claims 1 to 12, wherein said engaging portion (28) of said stopper (25) extends along said tilt bolt (20) toward said first end portion (21) of said tilt bolt (20).
  14. An assembly according to one of the claims 1 to 13, wherein said fixing nut (24) comprises an outward flange abutting on said stopper (25).
  15. An assembly according to one of the claims 1 to 14, wherein one of said washer portion (27) of said stopper (25) and said outward flange (23) of said tilt bolt (20) comprises a non-flat side surface abutting on the other of said washer portion (27) and said outward flange (23).
  16. An assembly according to claim 15, wherein said non-flat side surface is formed with a plurality of radial ridges radiating symmetrically around a center of said non-flat side surface.
  17. An assembly according to claim 12, wherein said second side wall (35) of said distance bracket member (32) comprises a projecting portion, said projecting portion of said distance bracket member (32) and said engaging portion (28) of said stopper (25) project beyond said second side wall (35) of said upper clamp member (34), and engage with each other and wherein said projecting portion of said distance bracket member (32) comprises an engaging hole (33), and said engaging portion (28) of said stopper (25) comprises an angled end engaging in said engaging hole (33) of said distance bracket member (32).
  18. An assembly according to claim 12, wherein said rotation stopper (25) is formed with two of said engaging portions (29) extending radially from said washer portion (27) in diagonally opposite directions, and comprising angled ends received in said elongate aperture (36) of said second side wall (35) of said upper clamp member (34).
  19. An assembly according to one of the claims 1 to 18, wherein said washer portion (27) of said stopper (25) is formed with a center hole (26) receiving said second end portion (22) of said tilt bolt (20) and allowing said tilt bolt (20) to rotate therein.

#### Patentansprüche

1. Anordnung zum Lagern einer Lenksäule (1) eines Fahrzeuges mit:

einem Halterungsaufbau mit einem Abstands-

halterungsteil (32) zum Lagern der Lenksäule (1), und in oberes Klemmteil (34) zum Lagern des Abstandshalterungsteiles (32), wobei das obere Klemmteil (34) eine erste und eine zweite Seitenwand (35) aufweist, jede versehen mit einer langgestreckten Öffnung (36) gebildet, um es dem Abstandshalterungsteil (32) zu erlauben, sich zwischen der ersten und zweiten Seitenwand (35) zu bewegen, um eine Position der Lenksäule (1) einzustellen;

einem Neigungsbolzen (20), der durch das Abstandshalterungsteil (32) und die langgestreckte Öffnungen (36) des oberen Klemmteiles (34) hindurchgeht, wobei der Neigungsbolzen (20) einen ersten und einen zweiten Endabschnitt (21, 22);

einem Neigungshebel (7), verschraubt mit dem ersten Endabschnitt (21) des Neigungsbolzens (20);

und

einer Einstellvorrichtung, die einen Bolzendrehanschlag (25) aufweist, mit einem Scheibenabschnitt (27), montiert auf dem zweiten Endabschnitt (22) des Neigungsbolzens (20), und einem Eingriffsabschnitt (28; 29), der mit dem Halterungsaufbau im Eingriff ist, und einer Anschlagbefestigungsmutter (24), aufgeschraubt auf dem zweiten Endabschnitt (22) des Neigungsbolzens (20) zum Befestigen des Anschlages (25) auf dem Neigungsbolzens (20),

**dadurch gekennzeichnet, daß**

der Neigungsbolzen (20) außerdem einen äußeren Flansch (23) aufweist und jener Scheibenabschnitt (27) des Anschlages (25) eingespannt ist zwischen dem äußeren Flansch (23) des Neigungsbolzens (20) und der Befestigungsmutter (24).

2. Anordnung nach Anspruch 1, wobei das obere Klemmteil (34) vorgesehen ist an einer Fahrzeugkarosserie befestigt zu werden, wobei der zweite Endabschnitt (22) des Neigungsbolzens (20) mit einem Schraubengewinde gebildet ist, der Eingriffsabschnitt (28; 29) des Anschlages (25) in Eingriff ist mit dem Abstandshalterungsteil (32) oder langgestreckten Öffnung (36), gebildet in der zweiten Seitenwand (35) des oberen Klemmteiles (34), und der Scheibenabschnitt (27) und der Eingriffsabschnitt (28; 29) einstückige Teile des Anschlages (25) sind.
3. Anordnung nach Anspruch 1, wobei der zweite Endabschnitt (22) des Neigungsbolzens (20) mit einem nicht-kreisförmigen Abschnitt (31) gebildet ist, zum Aufnehmen eines Drehmomentes, das den Neigungsbolzen (20) dreht.
4. Anordnung nach Anspruch 1, wobei der äußere

Flansch (23) des Neigungsbolzens (20) oder der Scheibenabschnitt (27) des Anschlages (25) eine nicht-ebene Seitenoberfläche aufweist, gebildet mit zumindest einer Rippe (30).

5. Anordnung nach einem der Ansprüche 1 bis 4, wobei der Eingriffsabschnitt (28) des Anschlages (25) gestaltet ist, um eine Drehung des Anschlages (25) zu verhindern, und im Eingriff mit einer Eingriffsbohrung (33), gebildet in dem Abstandshalterungsteil (32) oder der langgestreckten Öffnung (36), gebildet in der zweiten Seitenwand (35) des oberen Klemmteiles (34).
6. Anordnung nach einem der Ansprüche 1 bis 5, wobei die Befestigungsmutter (24) eine Nicht-Hutmutter ist und eine Innengewinde-Durchgangsbohrung aufweist, die sich durch die Mutter (24) erstreckt, von einem ersten offenen Ende, das sich in einer ersten Seite der Befestigungsmutter (24) öffnet und einem zweiten offenen Ende, das sich in einer zweiten Seite der Befestigungsmutter (24) öffnet, und der zweite Endabschnitt (22) des Neigungsbolzens (20) einen nicht-kreisförmigen Abschnitt aufweist, der sich axial erstreckt und der eine polygonale Querschnittsform hat.
7. Anordnung nach Anspruch 6, wobei der nicht-kreisförmige Abschnitt (31) des Neigungsbolzens (20) in einer Form einer nicht-kreisförmigen Ausnehmung oder eines nicht-kreisförmigen Vorsprungs ist.
8. Anordnung nach einem der Ansprüche 1 bis 7, wobei der äußere Flansch (23) des Neigungsbolzens (20) zwischen der zweiten Seitenwand (35) des oberen Klemmteiles (34) und dem Scheibenabschnitt (27) des Anschlages (25) eingespannt ist.
9. Anordnung nach einem der Ansprüche 1 bis 8, wobei der Neigungshebel (7) eine Klemmmutter (10) aufweist, geschraubt auf den ersten Endabschnitt (21) des Neigungsbolzens (20).
10. Anordnung nach Anspruch 9, wobei der äußere Flansch (23) des Neigungsbolzens (20) eine nicht-gezackte, glatte Außenseiten-Umfangsfläche aufweist, und wobei der Scheibenabschnitt (27) des Anschlages (25) eine Mittelbohrung aufweist, die eine nicht-kerbverzahnte, glatte Innenumfangsfläche hat.
11. Anordnung nach Anspruch 9, wobei der äußere Flansch (23) des Neigungsbolzens (20) eine Innen-seitenoberfläche aufweist, anliegend auf der zweiten Seitenwand (35) des oberen Klemmteiles (34), einen Außenseitenumfang, anliegend auf dem Scheibenabschnitt (27) des Anschlages (25) und eine äußere Umfangsfläche, die von dem Anschlag

(25) beabstandet ist.

12. Anordnung nach einem der Ansprüche 1 bis 11, wobei die Lenksäule (1) auf dem Abstandshalterungsteil (32) fest montiert ist, wobei das Abstandshalterungsteil (32) eine erste und eine zweite Seitenwand aufweist, die jeweils mit Durchgangsbohrungen versehen sind, die den Neigungsbolzen (20) aufnehmen und die zwischen der ersten und der zweiten Seitenwand (35) des oberen Klemmteiles (34) angeordnet sind, und wobei das obere Klemmteil (34) zwischen dem Neigungshebel (7) und dem äußeren Flansch (23) des Neigungsbolzens (20) angeordnet ist.
13. Anordnung nach einem der Ansprüche 1 bis 12, wobei der Eingriffsabschnitt (28) des Anschlages (25) sich entlang des Neigungsbolzens (20) in Richtung des ersten Endabschnittes (21) des Neigungsbolzens (20) erstreckt.
14. Anordnung nach einem der Ansprüche 1 bis 13, wobei die Befestigungsmutter (24) einen äußeren Flansch aufweist, der auf dem Anschlag (25) aufliegt.
15. Anordnung nach einem der Ansprüche 1 bis 14, wobei der Scheibenabschnitt (27) des Anschlages (25) oder der äußere Flansch (23) des Neigungsbolzens (20) eine nicht-ebene Seitenoberfläche aufweist, die an dem anderen Scheibenabschnitt (27) oder dem äußeren Flansch (23) anliegt.
16. Anordnung nach Anspruch 15, wobei die nicht-ebene Seitenoberfläche mit einer Mehrzahl von radialen Nuten gebildet ist, die symmetrisch rund um eine Mitte der nicht-ebenen Seitenoberfläche strahlenförmig sich ausbreiten.
17. Anordnung nach Anspruch 12, wobei die zweite Seitenwand (35) des Abstandshalterungsteil (32) einen vorspringenden Abschnitt aufweist, der vorspringende Abschnitt des Abstandshalterungsteil (32) und der Eingriffsabschnitt (28) des Anschlages (25) über die zweite Seitenwand (35) des oberen Klemmteiles (34) vorspringen, und miteinander im Eingriff sind, und wobei der vorspringende Abschnitt des Abstandshalterungsteiles (32) eine Eingriffsbohrung (33) aufweist, und der Eingriffsabschnitt (28) des Anschlages (25) ein abgewinkeltes Ende aufweist, das in der Eingriffsbohrung (33) des Abstandshalterungsteil (32) im Eingriff ist.
18. Anordnung nach Anspruch 12, wobei der Drehanschlag (25) mit zwei der Eingriffsabschnitten (29) gebildet ist, die sich radial von dem Scheibenabschnitt (27) in diagonal entgegengesetzte Richtungen erstrecken, und die mit abgewinkelten Enden

versehen sind, aufgenommen in der langgestreckten Öffnung (36) der zweiten Seitenwand (35) des oberen Klemmteiles (34).

19. Anordnung nach einem der Ansprüche 1 bis 18, wobei der Scheibenabschnitt (27) des Anschlages (25) mit einer Mittelbohrung (26) gebildet ist, die den zweiten Endabschnitt (22) des Neigungsbolzens (20) aufnimmt und die dem Neigungsbolzen (20) gestattet, sich darin zu drehen.

## Revendications

1. Ensemble pour supporter une colonne de direction (1) d'un véhicule, comprenant :

une structure de support comprenant un élément de support d'écartement (32) pour supporter la colonne de direction (1), et un élément de serrage supérieur (34) pour supporter l'élément de support d'écartement (32), ledit élément de serrage supérieur (34) comprenant des première et seconde parois latérales (35) présentant chacune une ouverture oblongue (36) pour permettre à l'élément de support d'écartement (32) de se déplacer entre lesdites première et seconde parois latérales (35) afin d'ajuster une position de la colonne de direction (1) ;

un boulon de basculement (20) passant à travers ledit élément de support d'écartement (32) et les ouvertures oblongues (36) de l'élément de serrage supérieur (34), ledit boulon de basculement (20) comprenant des première et seconde portions d'extrémité (21, 22) ; un levier de basculement (7) vissé sur ladite première portion d'extrémité (21) du boulon de basculement (20) ; et un mécanisme d'ajustement qui comprend une butée d'arrêt de rotation de boulon (25) comprenant une portion de rondelle (27) montée sur ladite seconde portion d'extrémité (22) dudit boulon de basculement (20), et une portion d'engagement (28 ; 29) venant en prise avec ladite structure de support, et un écrou de fixation de butée d'arrêt (24) vissé sur la seconde portion d'extrémité (22) du boulon de basculement (20) pour fixer ladite butée d'arrêt (25) audit boulon de basculement (20), caractérisé en ce que ledit boulon de basculement (20) comprend en outre une bride extérieure (23) et que ladite portion de rondelle (27) de ladite butée d'arrêt (25) est serrée entre ladite bride extérieure (23) dudit boulon de basculement (20) et ledit écrou de fixation (24).

2. Ensemble selon la revendication 1, où ledit élément de serrage supérieur (34) est apte à être fixé à une

- caisse de véhicule, ladite seconde portion d'extrémité (22) dudit boulon de basculement (20) présente un filet de vis, ladite portion d'engagement (28 ; 29) de ladite butée d'arrêt (25) vient en prise avec l'un parmi ledit élément de support d'écartement (32) et ladite ouverture oblongue (36) ménagée dans ladite seconde paroi latérale (35) dudit élément de serrage supérieur (34), et ladite portion de rondelle (27) et ladite portion d'engagement (28 ; 29) sont des parties intégrales de ladite butée d'arrêt (25).
3. Ensemble selon la revendication 1, où ladite seconde portion d'extrémité (22) dudit boulon de basculement (20) présente une portion non circulaire (31) pour recevoir un couple faisant tourner ledit boulon de basculement (20). 5
  4. Ensemble selon la revendication 1, où l'une parmi ladite bride externe (23) dudit boulon de basculement (20) et ladite portion de rondelle (27) de ladite butée d'arrêt (25) comprend une surface latérale non-plate présentant au moins une nervure (30). 10
  5. Ensemble selon l'une des revendications 1 à 4, où ladite portion d'engagement (28) de ladite butée d'arrêt (25) est configurée pour empêcher la rotation de ladite butée d'arrêt (25) et est en prise avec l'un d'un trou d'engagement (33) ménagé dans ledit élément de support d'écartement (32) et ladite ouverture oblongue (36) ménagée dans ladite seconde paroi latérale (35) dudit élément de serrage supérieur (34). 15
  6. Ensemble selon l'une des revendications 1 à 5, où ledit écrou de fixation (24) est un écrou sans chapeau et comprend un trou traversant taraudé s'étendant à travers ledit écrou (24) à partir d'une première ouverture à extrémité ouverte dans un premier côté dudit écrou de fixation (24) et une seconde ouverture à extrémité ouverte dans un second côté dudit écrou de fixation (24), et ladite seconde portion d'extrémité (22) dudit boulon de basculement (20) comprend une portion non circulaire s'étendant axialement et d'une forme polygonale en section transversale. 20
  7. Ensemble selon la revendication 6, où ladite portion non circulaire (31) dudit boulon de basculement (20) est dans une forme parmi l'un d'un évidement non circulaire et d'une saillie non circulaire. 25
  8. Ensemble selon l'une des revendications 1 à 7, où ladite bride externe (23) dudit boulon de basculement (20) est serrée entre ladite seconde paroi latérale (35) dudit élément de serrage supérieur (34) et ladite portion de rondelle (27) de ladite butée d'arrêt (25). 30
  9. Ensemble selon l'une des revendications 1 à 8, où ledit levier de basculement (7) comprend un écrou de serrage (10) vissé sur ladite première portion d'extrémité (21) dudit boulon de basculement (20). 35
  10. Ensemble selon la revendication 9, où ladite bride externe (23) dudit boulon de basculement (20) comprend une surface circonférentielle extérieure lisse non cannelée, et où ladite portion de rondelle (27) de ladite butée d'arrêt (25) comprend un trou central ayant une surface circonférentielle intérieure lisse non cannelée. 40
  11. Ensemble selon la revendication 9, où ladite bride externe (23) dudit boulon de basculement (20) comprend une surface latérale intérieure butant contre ladite seconde paroi latérale (35) dudit élément de serrage supérieur (34), une surface latérale extérieure butant contre ladite portion de rondelle (27) de ladite butée d'arrêt (25) et une surface circonférentielle extérieure qui est espacée de ladite butée d'arrêt (25). 45
  12. Ensemble selon l'une des revendications 1 à 11, où la colonne de direction (1) est montée fixement sur ledit élément de support d'espacement (32), ledit élément de support d'espacement (32) comprend des première et seconde parois latérales qui présentent, respectivement, des trous traversants recevant ledit boulon de basculement (20) et qui sont placés entre lesdites première et seconde parois latérales (35) dudit élément de serrage supérieur (34), et ledit élément de serrage supérieur (34) est placé entre ledit levier de basculement (7) et ladite bride externe (23) dudit boulon de basculement (20). 50
  13. Ensemble selon l'une des revendications 1 à 12, où ladite portion d'engagement (28) de ladite butée d'arrêt (25) s'étend le long dudit boulon de basculement (20) vers ladite première portion d'extrémité (21) dudit boulon de basculement (20). 55
  14. Ensemble selon l'une des revendications 1 à 13, où ledit écrou de fixation (24) comprend un épaulement externe butant contre ladite butée d'arrêt (25).
  15. Ensemble selon l'une des revendications 1 à 14, où l'une parmi ladite portion de rondelle (27) de ladite butée d'arrêt (25) et ladite bride externe (23) dudit boulon de basculement (20) comprend une surface latérale non-plate butant contre l'autre parmi ladite portion de rondelle (27) et ladite bride externe (23).
  16. Ensemble selon la revendication 15, où ladite surface latérale non-plat présente plusieurs nervures radiales rayonnant d'une manière symétrique autour d'un centre de ladite surface latérale non-



plate.

17. Ensemble selon la revendication 12, où ladite seconde paroi latérale (35) dudit élément de support d'espacement (32) comprend une portion saillante, ladite portion saillante dudit élément de support d'espacement (32) et ladite portion d'engagement (28) de ladite butée d'arrêt (25) faisant saillie au-delà de ladite seconde paroi latérale (35) dudit élément de serrage supérieur (34) et viennent en prise l'une avec l'autre, et où ladite portion saillante dudit élément de support d'espacement (32) comprend un trou d'engagement (33), et ladite portion d'engagement (28) de ladite butée d'arrêt (25) comprend une extrémité angulaire s'engageant dans ledit trou d'engagement (33) dudit élément de support d'espacement (32).
18. Ensemble selon la revendication 12, où ladite butée d'arrêt de rotation (25) présente deux desdites portions d'engagement (29) s'étendant radialement à partir de ladite portion de rondelle (27) dans des directions diagonalement opposées, et comprenant des extrémités angulaires reçues dans ladite ouverture oblongue (36) de ladite seconde paroi latérale (35) dudit élément de serrage supérieur (34).
19. Ensemble selon l'une des revendications 1 à 18, où ladite portion de rondelle (27) de ladite butée d'arrêt (25) présente un trou central (26) recevant ladite seconde portion d'extrémité (22) dudit boulon de basculement (20) et permettant audit boulon de basculement (20) de tourner à l'intérieur.

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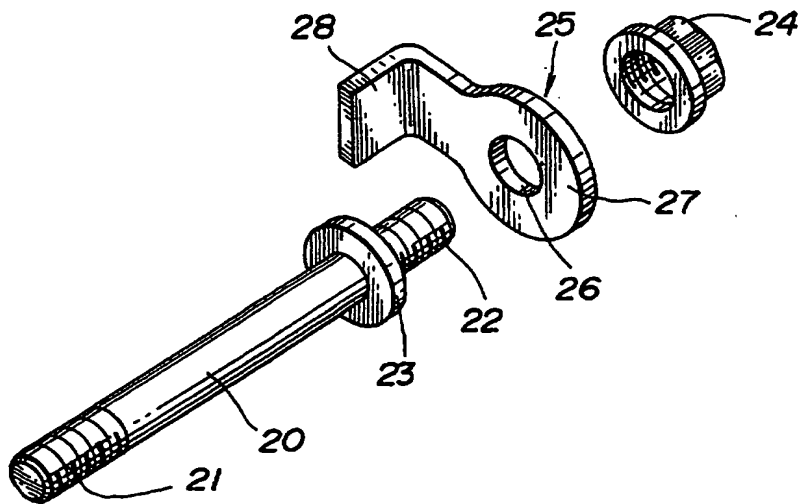
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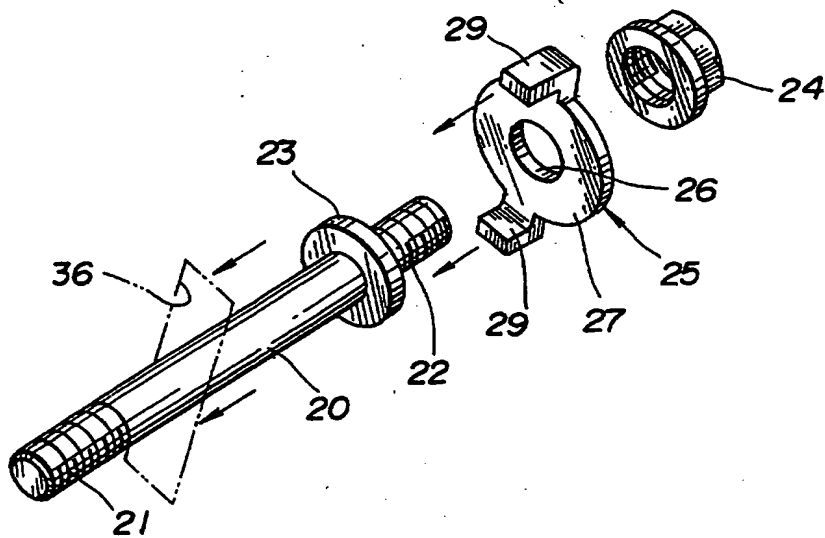
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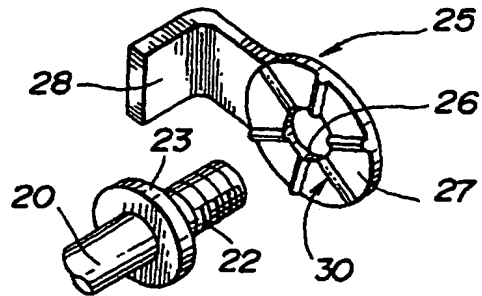
**FIG.1**



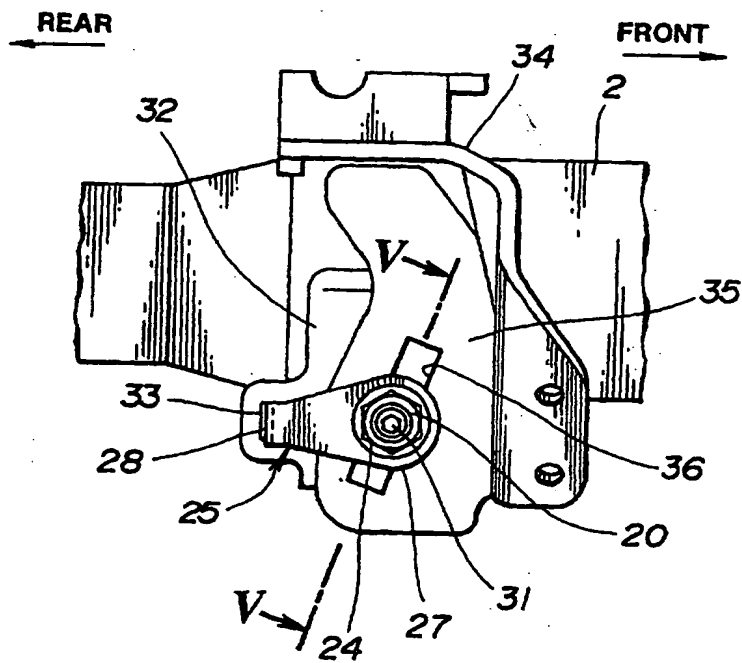
**FIG.2**



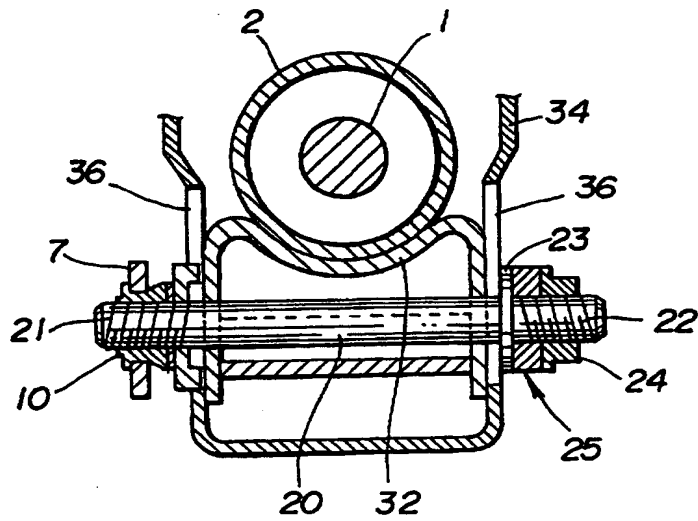
**FIG.3**



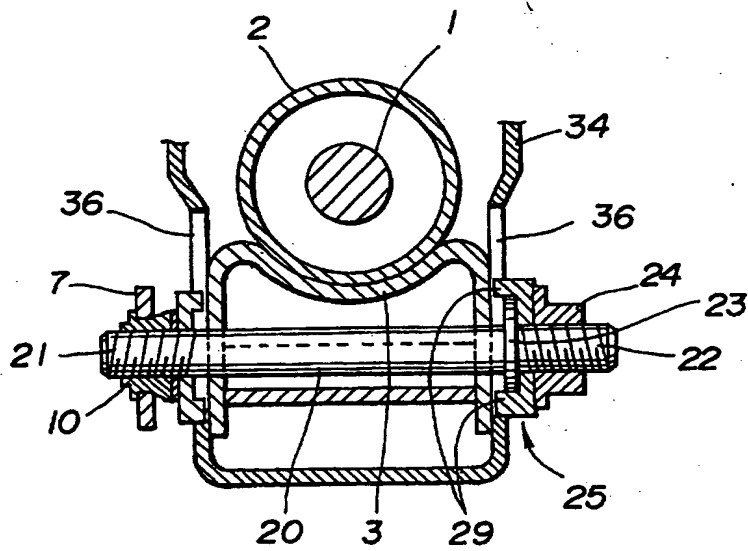
**FIG.4**



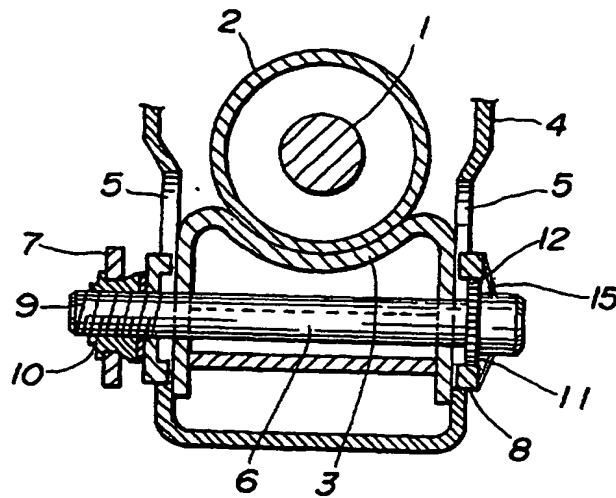
**FIG.5**



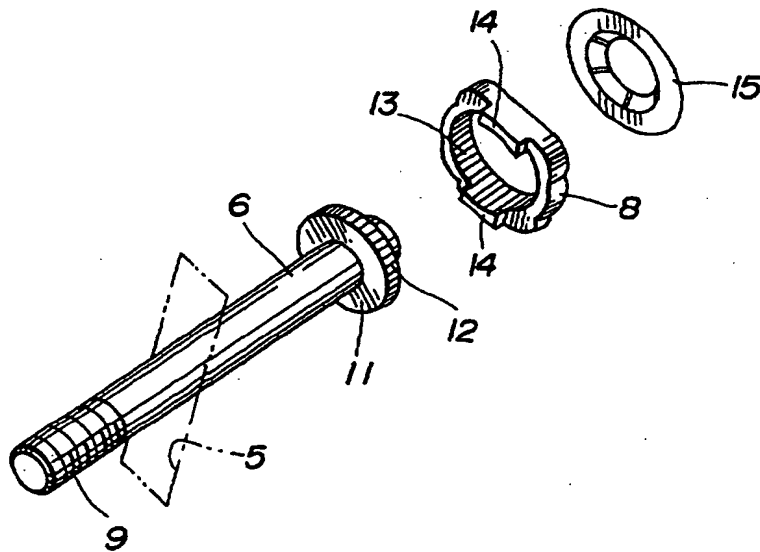
**FIG.6**



**FIG.7**  
(PRIOR ART)



**FIG.8**  
(PRIOR ART)



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